Soaking It Up

Topic: Land and Soil

Objectives: Explore the water infiltration ability of different soils

Grade Level: 4 – 12

Time: 20 – 25 minutes

Materials: empty coffee cans of two different sizes, permanent marker, watering pitchers with narrow spouts, timers or watches, hammers, wooden board pieces, rulers, writing pads, pens or pencils

Vocabulary: infiltration

Location: Oak Hill, Front Lawn Grove, Saturn Playground or Active Oval

Background: Water soaks into some soils more rapidly than others. The type of soil as well as how compacted the soil is affects its water infiltration ability. In this activity you and your classmates will compare the rates at which water filters through different soils.

Advance Preparation: Cut off both ends off of the coffee cans. With the marker, draw a ring about 5cm (2 inches) from one end of all the cans.

Procedure:

1. With a partner, collect one small and one large coffee can from your teacher or activity leader. Locate a level spot to measure the time it takes water to infiltrate the soil. Note the location and some of the characteristics of the area and the soil you have selected. For example, is the spot you have selected sunny or shady? Is the soil bare or covered in vegetation? What color is the soil? What texture is it? Have you selected a spot where people often walk or one that is normally not walked on?

2. First push the smaller can into the soil up to the marked ring. If you cannot push it in by hand, place the flat side of a piece of board on the top rim of the can and use the hammer to drive it into the ground. Do not hammer directly on the rim of the can. Then place the larger can around the smaller can and push it into the ground until the marked ring is even with the ground.

3. Using a pitcher, pour water into both the inner and the outer rings formed by the coffee cans. Try to keep the water level in both rings even until the inner can is filled to the top with water. Check your watch or set a timer for one minute.

4. As the water level in the outer ring goes below the water level in the inner can, carefully pour more water into the *outer ring only* until the outer ring water level is even with the inner water level. Repeat this process as necessary.

5. After one minute, use the ruler to check the distance from the inner can's water line to the top rim of the inner can. Record this distance. Check your watch or set the timer for another minute.

6. Continue checking and recording the distance between the inner can rim and the inner water line at one-minute intervals for ten minutes or until the water in the inner can has disappeared, whichever comes first. Remember to add water to the outer ring (but never to the inner ring) if you need to.

Questions to think about and discuss:

1. Compare the length of time it took the water at your spot to infiltrate the soil with that of your classmates. Whose soil soaked up water the fastest? Whose soil took the longest? How did the two areas differ in location and soil characteristics? Can you draw some conclusions about locations or soil characteristics that lead to rapid water infiltration and those that prohibit infiltration?

2. The purpose of the outer coffee can is to direct the water in the smaller inner can straight downward into the soil. What do you think might happen if the outer can was not used? How would this alter the results of your experiment?

3. What do you suppose would happen in a heavy rain to the area where water infiltration is slow? Can you find evidence to support your hypothesis?

4. Compare the areas of rapid and slow infiltration for plant growth. What types of plants grow in each area? How heavy is the plant growth in each area?

5. Why might a farmer or a construction engineer be concerned about water infiltration rates of soil? Try to think of other people who might be interested in the soil infiltration rate.